Limited Warranty

Products manufactured by Walrus Pumps Co (Walrus) are warranted to the first user only to be free of defects in material and workmanship for a period of 12 months from date of installation, but no more than 24 months from date of shipment. Walrus' liability under this warranty shall be limited to repairing or replacing at our election, without charge, FOB Walrus' distribution center or authorized service agent. Walrus will not be liable for any cost of removal, installation, transportation or any other charges that may arise in connection with warranty claim.

The warranty period commences on the date of original purchase of the equipment. Proof of purchase and installation date, failure date, and supporting installation data must be provided when claiming repairs under warranty.

This warranty is subject to due compliance by the original purchaser with all directions and conditions set out in the installation and operating instructions. Failure to comply with these instructions, damage or breakdown caused by fair wear and tear, negligence, misuse, incorrect installation, inappropriate chemicals or additives in the water, inadequate protection against freezing, rain or other adverse weather conditions, corrosive or abrasive water, lightning or high voltage spikes or through unauthorized persons attempting repairs are not covered under warranty.

Walrus will not be liable for any incidental or consequential damages, losses, or expenses, arising from installation, use, or any other causes. There are no express or implied warranties, including merchantability or fitness for a particular purpose, which extend beyond those warranties described or referred to above.

Certain states do not permit the exclusion or limitation of incidental or consequential damages or the placing of limitations on the duration of an implied warranty, therefore, the limitations or exclusions herein may not apply. This warranty sets forth specific legal rights and obligations, however, additional rights may exist, which may vary from state to state.

Supersedes all previous publications

WALRUS

WALRUS PUMP CO., LTD.
Web: www.walruspump.com

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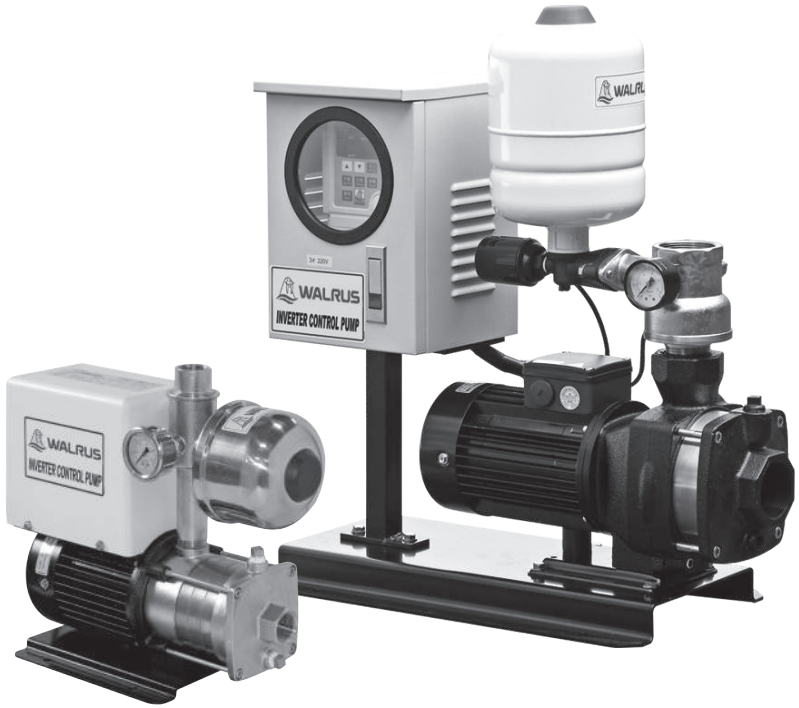
WALRUS

IC Series

Inverter Control Pump Instruction Manual



ISO 9001 Certified

Walrus Pump Co., Ltd.

1. Preface:

We appreciate your purchase of this Inverter Control Pump of variable frequency and constant pressure. For correct installation and use of this product, be sure to read this user's manual before proceeding with the installation for the sake of sound performance and safety. Please keep this manual all the time for future reference in maintenance, service and repairs.

When you purchase the product, be sure that it has undergone strict test and has been duly packed and handled with consideration of all factors. Before installation, be aware of the following and all irregularities shall be notified to the dealer of this office for solutions.

a. Damage of deformation during transportation.
b. Complete parts when you unpack the product.
c. Do the specifications of the product match the nameplate (Pressure and HP)?
d. Normal keys on the keyboard.
e. ISO label.

2. Functions and features:

a. Variable frequency and constant pressure control this product. Once the constant pressure is set, its service pressure will never exceed the preset one. (This is not the case for pressure difference type).
b. Smooth start and stop, low noise, minimum vibration and no water hammer.
c. No-water auto break as protection of the motor with auto start until water supply is resumed.
d. Auto water leakage sensor with pressure compensation.
e. In case of irregular variable frequency and constant pressure, the product is switched as a pressure difference type product, thus assuring water supply all the time. (TPH2T/4T-IC Standard model without pressure difference function.)
f. Compact, easy installation and operation.
g. Power supply of single phases 220V, 3-phase 220V and 3-phase 380V.

3. Installation and remarks

3.1 Site of installation

As the environment of the site of installation mainly determines service life of the product, the follow sites are recommended for installation:

a. Ambient temperature +4^{O}C~+40^{O}C with good ventilation and dryness.
b. Try not to install it outdoors to avoid sunshine and rain.
c. Installation sites free of vibration and major surges.
d. Installation sites for easy maintenance and service.

3.2 Installation remarks

a. To install the pump, keep out impurities. It's important to keep plastic pipes free of PVC glue, metal dregs that may jam the wheels.
b. Add NFB to input power supply as protection to the variator and the motor.
c. Is symbol for grounding terminal. Be sure to ground it for electric shocks.
d. Be sure of the power supply of single phase 220V, 3-phase 220V and 3-phase 380V.
e. Never run the product without water and keep water temperature at below 40^{O}C and do not user other liquids than water.
f. A metallic pipe should be used as the outlet pipe to avoid breakage due to high pressure or abnormal liquid temperature.

4.Console

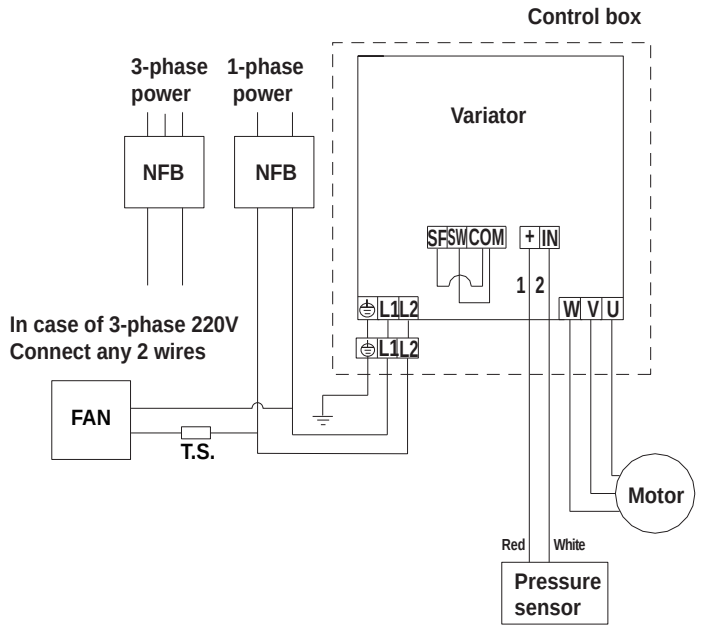
4.1 ●RUN

The constant pressure indicator that goes on during operation at constant pressure.

4.2 ●PSW

The pressure difference indicator that goes on during operation with pressure difference.

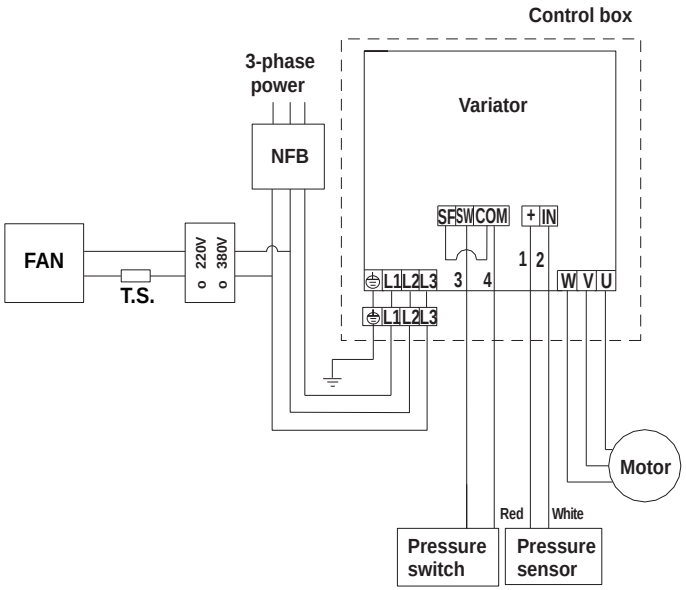
7.4 TPH2T/4TIC Standard model Single-phase 220V variator



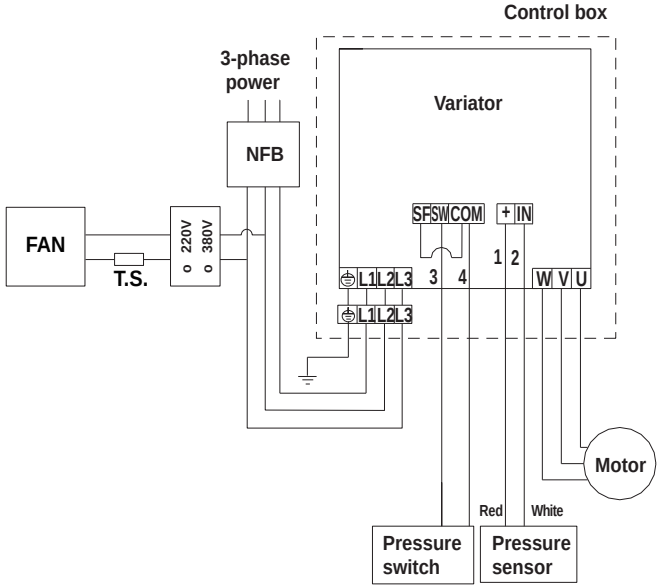
7.5 Remarks

a. To avoid frequent off of the thermostat in areas of hot water, remove the thermostat switch and have SF be connected with COM and keep water temperature at below 60^{O}C.
b. To add a water level switch, connect the water level switch with the thermostat switch.

7.2 3-phase variator



7.3 3-phase 5HP variator



4.3

Digital display of pressure setting (Maximum pressure set per model and pressures required.)

4.4

Digital display of actual pressure

4.5

2-digit display of pressure up between 00~99.

4.6

2-digit display of pressure down between 00~99.

4.7

Function memory key for all functions and data.

4.8

The key to stop the pump.

4.9

The key to start the pump.

4.10

Auto key to run the pump on constant pressure when ● RUN goes on

4.11

The key to run the pump with pressure difference when ● RUN and ● PSW go on at the same time.

5. Operation

5.1 Power on

5.1.1 Check the variator and the wiring diagram. The single phase variator runs on 220V ±10% (In case of 3-phase 220V ±10%, just connect any 2 of the wires). A 3-phase variator runs at 3-phase 220V ±10% or 380V ±10%.

5.1.2 Remove the water stop and fill the pump compartment before tightening the water stop.

5.1.3 Try to check if the wind hood runs in the same direction that of the steering nameplate.

5.2 When using auto control:

5.2.1 Press AUTO and then press PROG to switch the computer to run on VARIABLE AUTO.

5.2.2 Press ▲ and ▼ for a desired pressure and then press PROG to complete the setting.

5.2.3 To change the pressure setting, just repeat 5.2.2.

5.3 Pressure switch

5.3.1 Press PSW, at this time ● PSW of the upper left goes on. Press PROG to have the computer switch to PRESSURE SWITCH for pressure setting.

5.3.2 To resume AUTO, press AUTO and ● PSW of the upper left goes off. Press PROG to resume AUTO.

5.4 Remarks

5.4.1 Failure to press PROG after pressing SET or adjusting pressure figures, the function that had been set earlier will be resumed in case of blackout.

5.4.2 After the power goes off when there is no water, the display will show OL. Wait 10 minutes before the motor

restarts on its own. To force the pump to run, press STOP and then RUN to resume the operation.

5.4.3 PSW does not work when the pump runs on AUTO.
AUTO does not work when the pump runs on PSW.

5.4.4 It is recommendable to use AUTO for regular operations, as PSW is available as replacement.

6. Troubleshooting:

6.1 Pump motor
(Before proceeding with this step, turn the power off.)

6.1.1 The motor does not run:
- a. Check for correct voltage.
- b. Check for water supply.
- c. Check for stuck pump.
- d. When working on PSW, be sure to check if the silver contact of the pressure switch is on, if not, the silver contact may go oxidized and cleaning would become necessary.
- e. When the water temperature goes high, the thermostat switch would go off. Once the water is cooled, the operation would be resumed automatically.
- f. If the operation fails to go on, call service.

6.1.2 When the motor keeps running when with the water supply cut:
- a. Check if the faucet is tightened and whether the toilet and piping is leaking.
- b. Open the check valve to check for sticking or leakage.
- c. Low power supply.

6.2 Variator:

6.2.1 SF display: No operation. The safety terminal is OFF.
- a. Check the wiring protection for interruption.
- b. If no SF terminal is in use, be sure to have the SF terminal be connected with COM terminal.

6.2.2 OPE1 display: Warning on erroneous setting.
- a. Reset to run the operation once more after power off.
- b. If the same message appears again, call for service.

6.2.3 OL display: Abnormal display with water and power off.
- a. Check for cut power supply.
- b. Check if the pressure sensor has signals.
- c. Check the pump.
- d. In OL try starting the pump until water is available every 10 minutes.
- e. To force the pump to run, press STOP and then RUN to resume the operation.

6.2.4 EEP 1/EEP 2 display: Irregular memory.
- a. Reset and then press PROG.
- b. If the same problem appears, call for service.

6.2.5 PF01/PF02/PF03/PF04 display for irregular drive:
- a. Reset to run the operation once more after power off.
- b. If the same message appears again, call for service.

6.3 Remarks:
- a. For safe service, be sure to turn off the pump.
- b. When the red warning light in the variator goes on, be sure to keep your hands off the parts and the circuit board for electric shock.
- c. In case of failure of the internal parts, do not try to replace or repair them yourself, or this office would not be responsible for consequences.

7. Wiring diagram

7.1 Single-phase 220V variator